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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/755,445	01/05/2001	Gerd Heinrich	2-7	5119

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EXAMINER

WILLIAMS, LAWRENCE B

ART UNIT	PAPER NUMBER
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2634

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DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/755,445

Applicant(s)

HEINRICH ET AL

Examiner

Lawrence B Williams

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 January 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 January 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

1. This application has been filed with informal drawings, which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

2. The drawings are objected to because:

a.) In Fig. 2, examiner suggests applicant label elements 11-16 as referenced in specification. It is office policy to request from applicants that submitted figures contain both text and numerical labels to allow individuals viewing each figure to be able to determine the designation of each element in the figure without having to go into the specifications.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities: Examiner suggests applicant rewrite the last paragraph of page 2 for clarity.

Appropriate correction is required.

Claim Objections

4. Claim 1 is objected to because of the following informalities: Examiner suggests applicant replace the word "action" in line 4 of the claim with "section" or rewrite the claim. Appropriate correction is required.

5. Claims 15 and 19 are objected to because of the following informalities: Claims 15 and 19 recites the limitation "the first module" in line 1. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-6, 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling et al. (US Patent 5,245,611) in view of Harikumar et al. (US Patent 6,631,175 B2).

(1) With regard to claim 1, Ling et al. discloses in Fig. 2, a method for a digital transmission system, in which a first (205) and second (215) known symbol sequence ($\{s_1, s_2, \dots,$

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s_M) are transmitted, the frequency offset (ΔF) of the transmission system is estimated (abstract) by comparing a first section (1f_M) of the received signal (r) corresponding to the first symbol sequence with a second action (2f_M) of the received signal (r) corresponding to the second symbol sequence (col. 4, lines 3-41).

Ling et al is silent as to the square of the absolute value of a pulse response (h) of the transmission system is reduced in a time domain in order to lessen the influence of symbols (x) adjacent to the first or second known symbol sequence ($\{s_1, s_2, \dots, s_M\}$) on the first and second section ($^1f_M, ^2f_M$), respectively, of the received signal (r).

However, Harikumar et al. discloses a training process for a filter wherein the square of the absolute value of a pulse response (h) of the transmission system is reduced in a time domain in order to lessen the influence of symbols (x) adjacent to the first or second known symbol sequence ($\{s_1, s_2, \dots, s_M\}$) on the first and second section ($^1f_M, ^2f_M$), respectively, of the received signal (r) (col. 5, lines 25-33; col. 8, lines 20-52).

One skilled in the art would have clearly recognized that wherein the square of the absolute value of a pulse response of the transmission system is reduced in a time domain in order to lessen the influence of symbols adjacent to the first or second known symbol sequence on the first and second section, respectively, of the received signal is a well-known technique introduced in many references. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to apply the method as taught by Harikumar et al. to modify the invention of Ling et al. as a method of reducing intersymbol interference (col. 2, lines 12-19).

(2) With regard to claim 2, Ling et al. also discloses the method according to claim 1 in which the first and second symbol sequence are selected to be identical to one another (col. 4, lines 32-33).

(3) With regard to claim 3, Harikumar et al. also discloses the method according to claim 1 or 2, in which the reduction in the square of the absolute value of the domain of the pulse response (h) of the transmission system is undertaken with the aid of a filter (col. 2, lines 9-11).

(4) With regard to claim 4, Ling et al. also discloses a method in which a pulse response of the transmission system is estimated (col. 4, lines 15-20).

(5) With regard to claim 5, Harikumar et al. also discloses a method according to claim 4, in which coefficients of the filter are determined and/or adapted by means of the estimated pulse response (col. 3, lines 10-12).

(6) With regard to claim 6, Harikumar et al. also discloses the method according to claim 6, in which the pulse response is shortened (col. 3, lines 12-19).

(7) With regard to claim 13, claim 13 inherits all limitations of claim 1 above.

(8) With regard to claim 14, claim 14 inherits all limitations of claims 2 and 12 above.

(9) With regard to claim 15, Ling et al. also discloses in Fig. 3, a device according to claim 13 or 14, in which the first module (105) comprises a filter.

(10) With regard to claim 16, Ling et al. also discloses in Fig. 3, a device according to claim 15, which comprises a second module (325) for estimating a pulse response.

(11) With regard to claim 17, Harikumar et al. also discloses in Fig. 4, a device according to claim 16, which comprises a third module for determining and/or adapting suitable coefficients of the filter (col. 3, lines 7-19).

(12) With regard to claim 18, Harikumar et al. also discloses in Fig. 1, a device according to claim 17, in which the pulse response (h) can be shortened by means of the first module (SCISF).

8. Claims 7-12, and 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling et al. (US Patent 5, 245, 611) in combination with Harikumar et al. (US Patent 6,631,175 B2) as applied to claims 6, 18 above, and further in view of Simeon (US Patent 6, 233,276 B1).

(1) With regard to claim 7, as noted above, Ling et al. in combination with Harikumar et al. discloses all limitations of claims 1, 2,4,5, and 6. They do not however disclose the method in which the energy of a domain of the pulse response of the transmission system relative to the total energy of the pulse response is reduced with the aid of an all-pass filter.

✓ However, Simeon teaches a method in which the energy of a domain of the pulse response of the transmission system relative to the total energy of the pulse response is reduced with the aid of an all-pass filter (col. 2, lines 56-59).

One skilled in the art would have clearly recognized that a method in which the energy of a domain of the pulse response of the transmission system relative to the total energy of the pulse response is reduced with the aid of an all-pass filter is a well-known technique introduced in many references. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to apply the method as taught by Simeon to modify the invention of Ling et al. in combination with Harikumar et al. as a method of implementing a time domain filter for ISI mitigation.

(2) With regard to claim 8, Simeon also discloses a method according to claim 7, in which the all-pass filter is adapted to achieve a low-phase pulse response of the transmission system (col. 6, lines 19-26).

(3) With regard to claim 9, Ling et al. also discloses a method according to claim 8, in which one value of the first and second section of the received signal is determined by sampling the received signal (col. 10, lines 30-31).

(4) With regard to claim 10, Ling et al. also discloses a method according to claim 9, in which the angular difference in the complex plane between the first and second sample is used to estimate the frequency offset (col. 6, lines 49-62; col. 7, lines 45-65).

(5) With regard to claim 11, Ling et al. also discloses a method according to claim 10, in which several pairs of samples are averaged over the angular differences (col. 6, lines 49-62).

(6) With regard to claim 12, Ling et al. also discloses a method according to claim 11, in which the signals are transmitted in blocks (TDMA, Fig. 2), in particular in accordance with a GSM standard and/or EDGE standard (col. 6, lines 7-9).

(8) With regard to claim 19, Simeon also discloses a device according to claim 18, in which the first module (14) comprises an all-pass filter (col. 5, lines 56-59).

(9) With regard to claim 20, Simeon also discloses a device according to claim 19, in which the all-pass filter can be adapted to achieve a low-phase pulse response of the transmission system (col. 6, lines 19-26).

(10) With regard to claim 21, Ling et al. also discloses in Fig. 3, a device according to claim 20, which comprises a sampling device (107, 109) for the received signal, with the aid of which one value of the first and second section of the received signal can be sampled.

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(11) With regard to claim 22, Ling et al. also discloses a device according to claim 21, which comprises means (333) for estimating the frequency offset from the angular difference in the complex plane between the first and second sample (col. 6, lines 49-62; col. 7, lines 45-65).

(12) With regard to claim 23, Ling et al. also discloses a device according to Claim 22, which comprises means (333) for determining an average value of the angular differences of several pairs of samples (col. 6, lines 49-62).

(13) With regard to claim 24, Ling et al. also discloses a device according to Claim 23, which is adapted for transmission in blocks (TDMA, Fig. 2), in particular in accordance with a GSM standard and/or EDGE standard (col. 6, lines 7-9).

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence B Williams whose telephone number is 703-305-6969. The examiner can normally be reached on Monday-Friday (8:00-5:00).


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lawrence B. Williams

lbw
April 21, 2004



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